

## WEATHER IN THE UNITED STATES

## THE WEATHER ELEMENTS

[Climatological Division, OLIVER L. FASSIG, in Charge]

By M. C. BENNETT

## GENERAL SUMMARY

August, considering both temperature and precipitation for the whole country, was nearer a normal month than has been experienced for a long time. East of the Rocky Mountains the mean monthly temperature ranged generally but a degree or two above or below the normal, the Southern States being slightly below and the North slightly above the seasonal average. However, west of the Rocky Mountains the weather was generally warmer than the normal, while in the central portions of California the month was the hottest August of record.

Precipitation was above normal in the Atlantic States and considerable portions of the central Mississippi Valley and the far Southwest, while in the Great Plains area from western Kansas northward the precipitation was markedly deficient in some sections; large parts of South Dakota and Montana received less than one-fourth the normal, while much of the Pacific Northwest had practically a rainless month.

## TEMPERATURE

The first decade was considerably hotter than normal from the middle Plains and the upper Mississippi Valley eastward to the middle Atlantic and New England coasts. Likewise the interior of the North Pacific States had some very hot days at this time, but most portions of Montana and North Dakota were cooler than normal. During the second decade and the first few days of the last decade most of the country from New Mexico and the middle Plains eastward was cooler than normal, the deficiency being quite marked in the lower Mississippi Valley; but during this period substantially all northern districts and practically all the country west of the Continental Divide were hotter than normal, the excess in Montana being about 8° per day.

The closing week of August brought a marked change in Minnesota, Wisconsin, and Michigan, where unseasonably cool weather prevailed. Most of the eastern half of the country likewise was cooler than normal, except the immediate Atlantic coast. The western half was hotter than normal, especially Nevada and central and southern California.

In every State August averaged within about 3° of normal, this being the first month since October, 1929, to be so close to normal throughout the Nation. Almost all northern and far western districts averaged warmer than normal, the excess being 2° to 3° or slightly more in a great part of the Lake region, and in most of Utah, Nevada, and eastern Oregon, and the northeastern, central, and southwestern portions of California. At several coast stations in California from San Francisco southward, also at Fresno, in the San Joaquin Valley, the month was the hottest August of record.

From New Mexico and western Kansas eastward to the south Atlantic coast the temperature averaged almost everywhere a little below normal, the greatest deficiency, about 3° a day, occurring in Arkansas and parts of the States adjoining.

The highest temperatures in the various States were 100° or more, save in New England, but were practically

nowhere above 105° in the eastern half of the country. In the western half almost all States recorded 107° or higher, the very highest mark reported being 123° in southeastern California. In the eastern half the highest marks were noted during the first 10 days, but there was less uniformity in the West, though most of the Southwest noted the highest readings between the 18th and the 28th.

In a few Gulf and South Atlantic States which lack high mountains no reading lower than 50° was reported. In most States east of the Rocky Mountains the lowest marks were between 50° and freezing, but in Michigan, Wisconsin, and Minnesota several stations had temperatures considerably below freezing as the month ended, Wolverine, Mich., noting 24°. Temperatures about as low, or even lower, occurred at lofty stations in many far western States, the lowest of all being 17° in Colorado. The dates of lowest temperatures were largely within 10 days of the close of August, though in the central valleys and to southward and southeastward they were frequently noted about the 13th.

## PRECIPITATION

The rainfall of August was fairly well distributed in point of time. From the middle and northern portions of the Rocky Mountain region eastward to the western part of the Lake region and the lower Ohio Valley there were widespread rains of importance during the first decade, and the portion of this area lying east of the Missouri River again had considerable rainfall during the final week. In the Atlantic and Gulf States the chief rains came between the 6th and the 24th. There was important rainfall in the far Southwest between the 3d and the 7th, then again during the very last days of the month.

The geographical distribution of the August rains was apparently better than usual in summer, though in many cases there were marked differences in amounts within short distances; yet, as far as reported, every station east of the Mississippi River and south of the Ohio and the southern limit of New York measured at least an inch during the month. The State average amounts were at least 2 inches everywhere east of the Rocky Mountain States, save in South Dakota and Michigan, where they were slightly less.

Within this area east of the Rocky Mountain States only the two States just named and Vermont failed to average 80 per cent of normal, and these three had about two-thirds of normal. No States here averaged more than 140 per cent of normal except a few in the upper Ohio Valley and the southern part of the middle Atlantic area. In general there was moderately more than normal in southern New England, North Carolina, Tennessee, and the central valleys. From western Kansas to northwestern and central Texas there was a moderate to considerable shortage.

In the far West conditions varied widely. The districts close to the Mexican border usually had much more rainfall than normal, and there was an excess in most of Nevada, northern Utah, southern Wyoming, and northeastern Colorado. A considerable deficiency was noted in Montana and northern Wyoming and everywhere to westward, practically no rain whatever falling in Oregon, western Idaho, or southeastern Washington.

The greatest monthly amount reported by a station in the United States proper was 15.73 inches, at Red

Springs, N. C. In the central part of the country Eureka Springs, Ark., led, with 14.67 inches, and in the far West, Helvetia, Ariz., with 11.27 inches.

SUNSHINE AND RELATIVE HUMIDITY

More than the average amount of sunshine was received in the central and northern plateau and Pacific coast regions, while much less than the normal amount for August was received in the central and southern portions of California, the southern plateau region, and in the far Southwest generally. Elsewhere sunshine was

near the average, but slightly above in the Great Plains and slightly below in the East generally. The relative humidity was above the normal in the far Southwest, the north Pacific region, the central Mississippi and Ohio Valleys, and the Northern and Central Atlantic States. However, in all cases the averages were but slightly above the normal. Elsewhere the humidity was generally below the average, with minus departures rather pronounced in portions of the upper Mississippi and the Missouri Valleys and the northern Rocky Mountain region.

SEVERE LOCAL STORMS, AUGUST, 1931

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path yards <sup>1</sup>	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Woodburn, Iowa (north-west of)	1	3 p. m.	33		\$500	Tornado	Corn and haystacks damaged; path 1 mile long.	Official, U. S. Weather Bureau.
Greenfield (near), Iowa	1	6 p. m.			5,250	do	Buildings and crops damaged.	Do.
Malaska County, Iowa	1				1,000	Wind squall	Trees uprooted; corn and fences leveled; telephone communication interrupted.	Do.
Johnstown, Pa.	2	5:15 - 7:20 p. m.			125,000	Hail and rain	3 small bridges washed away; many basements flooded; 4 persons injured.	Do.
Prairieton (near), Ind.	2					Wind and rain	Sheds, barns and crops damaged; many trees blown down.	Do.
Overbrook (near), Kans.	3	7:09 p. m.	30			Small tornado	Minor damage to a few buildings; corn injured; path 1.5 miles long.	Do.
Saratoga Springs, Glens Falls, and North Troy, N. Y.	3				200,000	Electrical and wind	Hotel roof partially destroyed; damage to telephone, power lines and other property by falling trees.	Do.
Westport, Conn., and vicinity	3			1	75,000	Electrical, wind, hail and rain	Highways obstructed by fallen trees; wires blown down; windows and auto shields broken.	Hartford Times (Conn.).
Iuka, Kans., and vicinity	5	4:30 p. m.	880			Hail, rain and wind	Injury chiefly to corn; power lines damaged; path 3 miles long.	Official, U. S. Weather Bureau.
Big Horn and Yellowstone Counties, Mont.	7				435,600	Hail	Much less to buildings and crops; livestock killed.	Do.
Dallas County, Iowa	7	3 p. m.			1,700	Wind, squall	Telephone and trees damaged; plate glass broken.	Do.
San Elizario (near), Tex.	8	do	2,640			Hail	Crops almost total loss.	Do.
Sturtevant, Wis.	8	5:15 p. m.			2,750	Wind, squall	Small farm buildings damaged corn lodged.	Do.
Bucyrus (near), Ohio	8				1,000	Wind	Farm buildings and trees damaged; crops hurt.	Do.
Philadelphia, Pa., and vicinity north of	10	5-8 p. m.			100,000	Rain and electrical	Damage chiefly by flooding of basements and subway.	Do.
Reading, Pa.	10	P. m.			50,000	do	Mill partially destroyed; electric and telephone service crippled; crops leveled.	Do.
Between Woodfield and Etchison, Md.	10				5,000	Electrical	Large barn and contents destroyed.	Do.
Sheffield Lake Village, Ohio	11	10:30 p. m.	16-34		50,000	Probably tornado	Numerous cottages wrecked; overhead wires blown down; 10 persons injured.	Do.
Remsenburg, N. Y.	12	9 a. m.	10			Wind	Trees uprooted; several farm buildings damaged.	Do.
Salt Lake City, Utah, and vicinity	13	P. m.			25,000	Heavy rain and wind	Gravel pit equipment, railways, highways, residence and business properties damaged.	Do.
McClain and Garvin Counties, Okla.	16	4 p. m.	2 mi.		10,000	Hail	Damage confined to crops; path 8 miles long.	Do.
Denver, Fort Lupton, and Hudson, Colo.	16				151,500	do	Extensive damage to crops and other property.	Do.
Polk County, Iowa	18	3 p. m.			3,000	do	Farm property damaged.	Do.
Concordia, Kans. (10 miles northeast)	18	5:30 p. m.	100		3,000	Small tornado	Damage chiefly to small farm buildings; path 1 mile long.	Do.
Due West, S. C.	18		7			do	Did not reach ground but crops directly under it were damaged.	Do.
Guthrie County, Iowa	19	4 p. m.	2 mi.			Wind and hail	Crops almost total loss in places; path 7 miles long.	Do.
Iowa County, Iowa	19				6,000	do	Buildings and crops damaged.	Do.
Filmore County, Nebr.	20	3-4 p. m.	3 mi.		35,000	Hail and wind	Chief damage to crops; a few windmills and trees blown down; path 18 miles long.	Do.
New Braunfels (near), Tex.	20	8:25 p. m.			500	Tornado and hail	Crops completely destroyed in small area; minor damage to buildings.	Do.
Richmond, Va.	20				20,000	Rain	Industrial plants flooded, walls, sidewalks, and pavements undermined; telephone service crippled.	Do.
Leesville (near), N. C.	21	3 p. m.			80,000	Wind and rain	Chief damage to crops.	Do.
Olton (near), Tex.	21	5 p. m.	2 mi.			Hail	Severe injury to crops; some stock loss.	Do.
Ione (near), N. Mex.	22	11 p. m.	2 mi.			do	Considerable damage, character not reported.	Do.
Chesapeake Bay and Eastern Shore, Md.	22-23					Wind and rain	Corn flattened; tomatoes damaged; fruit blown off; wires broken; boats driven ashore.	Do.
York and Seward Counties, Nebr.	25	3-4 p. m.	3 mi.		20,000	Hail and wind	Much crop damage; poultry killed; path 20 miles long.	Do.
Centrahoma to Atoka, Okla.	25	4:30 p. m.	880-3,520		14,000	Hail	Crops damaged; path 20 miles long.	Do.
Jefferson County, Nebr.	25	4:30-5 p. m.			60,000	do	Considerable crop loss.	Do.
Bryan County, Okla. (southwestern)	25	7 p. m.	1,760		26,000	do	Crops damaged; path 9 miles long.	Do.
Frederick County, Md.	25					Hail and wind	Corn stripped; trees blown down.	Do.
Lenoir City, Tenn.	26				10,000	Electrical	Residence destroyed.	Do.
Cerro Gordo County, Iowa	27	1-1:30 p. m.	25-34	1	160,000	Wind, hail, and tornado	Pavilion, theater, numerous cottages and trees damaged or wrecked; crops injured; path 7 miles long; tornado near Clear Lake; 21 persons injured.	Do.
Fayette County, Iowa	27	3:30 p. m.				Wind, hail, and electrical	Heavy crop loss; telephone service disrupted; 40 cows killed.	Do.
Buchanan County, Iowa	27	4 p. m.			10,000	Hail	Windows, roofs, and auto tops pierced; crops hurt; poultry killed.	Do.
Muscatine County, Iowa	27	5 p. m.	70		12,000	Wind and tornado	Tornado near Muscatine; damage on 3 farms; path 6 miles long.	Do.

<sup>1</sup> "Mi." signifies miles instead of yards.